



**MTI CDADTAN.**  
in partnership with **FWT**

*MTI Direct Drive Friction Welder*



## *MTI Direct Drive Friction Welder*

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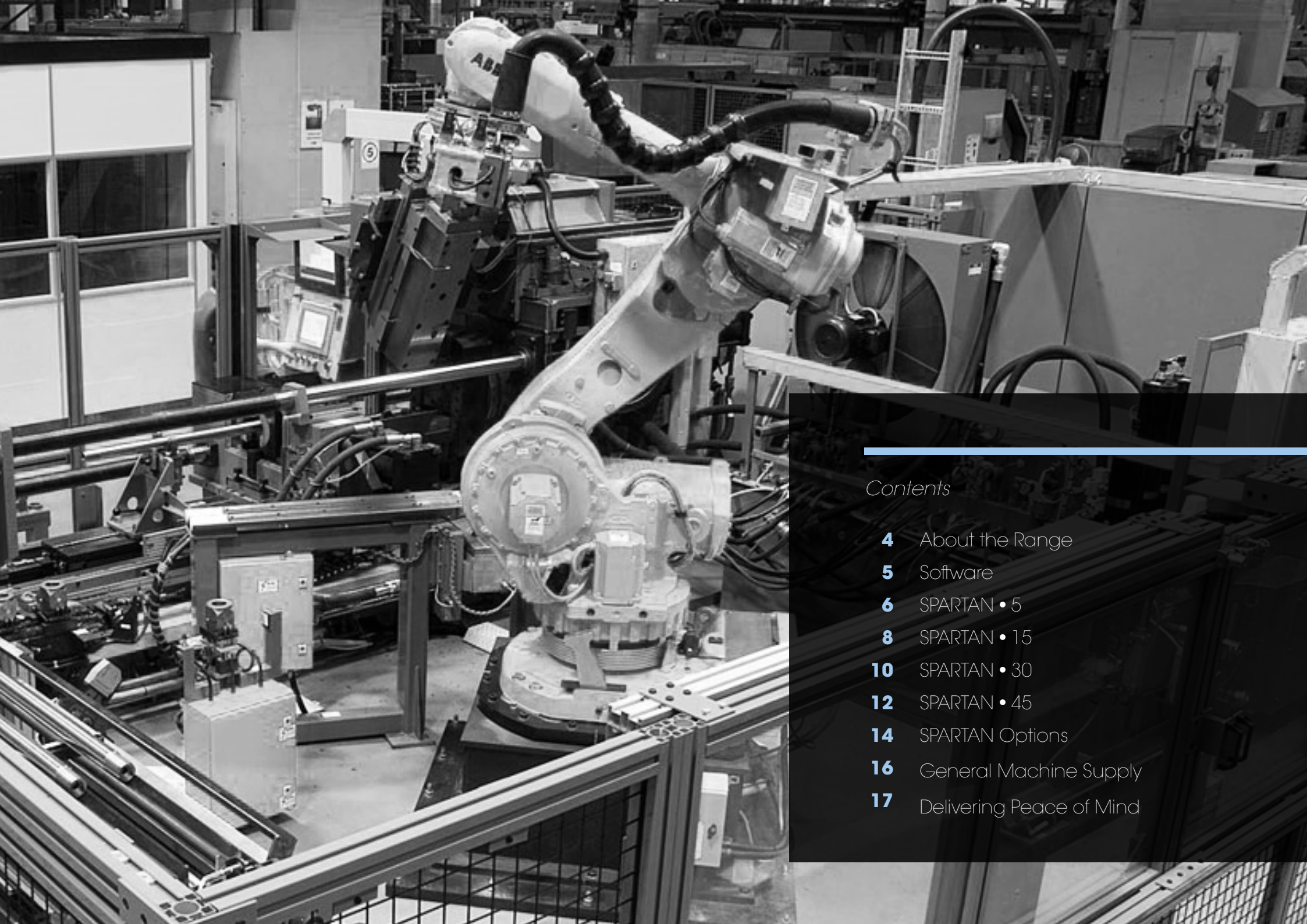
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# About the Range

## MTI DIRECT DRIVE FRICTION WELDER

As a leading global supplier of joining solutions, MTI is renowned for designing and building some of the world's most advanced customized friction and resistance welding systems.

Introducing SPARTAN - MTI's newest line of standard Direct Drive Rotary Friction Welders.

Expertly engineered, SPARTAN sticks to the basics to provide you with consistent, durable welds at a reduced cost.

While still manufactured to the highest standards, SPARTAN offers reduced manufacturing lead times, versatility, and outstanding value.

The SPARTAN is available as a 5, 15, 30, and 45-ton machine.



### MTI Remote Access

To help you avoid costly downtimes, we'll keep your machine running in peak condition. The SPARTAN can map and assign I/Os remotely to reduce machine breakdown time and prevent production losses. If a machine issue should arise, we get you back up and running quickly and correctly with our quick response time and use of MTI's exceptional remote access software to diagnose and correct machine issues.

**[Click here to learn more about MTI Remote Access](#)**



**MTI SPARTAN.5**  
In partnership with FDC



**MTI SPARTAN.15**  
In partnership with FDC



**MTI SPARTAN.30**  
In partnership with FDC



**MTI SPARTAN.45**  
In partnership with FDC

# SOFTWARE

## MTI's Standard Control System

MTI's advanced, user-friendly control system software consists of your choice of a Phoenix, Siemens, or Allen Bradley PLC.

The PLC is responsible for all data acquisition and machine control. PC and Windows interfaces are responsible for the data display, diagnostic messaging, parameter input, and data storage.

Taking human error out of the equation, the preemptive control system detects issues related to operator error, such as incorrectly loading parts, before the welding process begins.

## Operator Interface

The standard control system provides a user-friendly operator interface that contains all the basic functions needed to set up and operate a friction welding machine.

Ethernet I/Os with IP67 protection collect and transmit signals and data to your systems while interlocks manage access control for added safety and security.

Special features, such as adding automation, are made available through a flexible PC compatible platform.

The computer runs the latest Microsoft Windows operating system and all operator interface programs are specifically designed using the LABVIEW platform.

User-friendly and highly configurable, the operator interface stores weld history across different parameters and enables configurable reporting by:

- Job
- Part
- Operator
- Job Status
- Client

The intuitive operator interface also displays the weld parameters and diagnostics as well as real-time reports and much more.







## DIRECT DRIVE FRICTION WELDING MACHINE SPARTAN.5

Designed with cost in mind, the SPARTAN 5 is the smallest machine in the SPARTAN lineup.

A reliable 5-ton Direct Drive Friction Welder, this cost-effective machine produces welds from a minimum weld area of 50 mm<sup>2</sup> up to a maximum weld area of 333 mm<sup>2</sup>.

Utilizing the latest in friction welding technology, the SPARTAN 5 allows design engineers to cut costs by joining dissimilar metals such as aluminum and copper for battery cables.

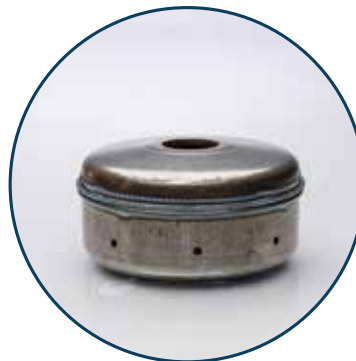
Effective and efficient, the SPARTAN can seamlessly integrate into your existing production line or a fully automated production cell to maximize the efficiency of the available production space.

A quality machine backed by MTI, the SPARTAN 5 is commonly used for joining air conditioning compressor pistons, airbag inflators, and much more.

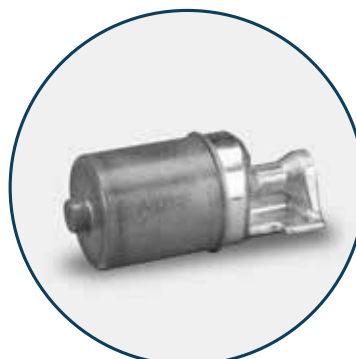
To learn if the Spartan 5 is right for you next project, talk to our experts about:

- The materials you're joining
- The weld geometry of your two parts
- The area of your weld interface

[Click here to email our experts](#)



AIRBAG INFLATORS

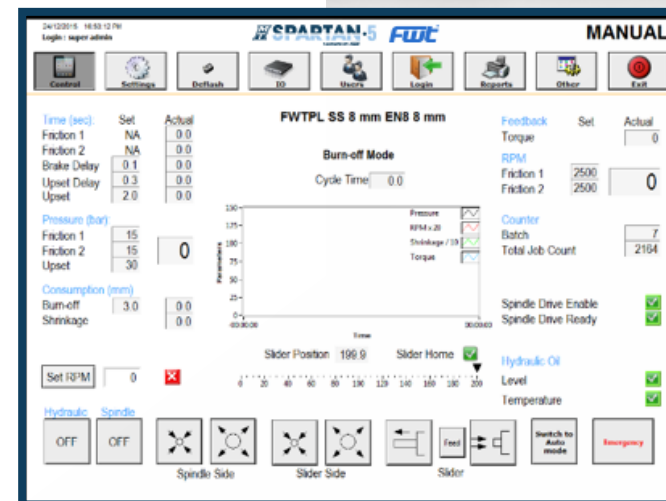


AIR CONDITIONING  
COMPRESSOR PISTONS



BATTERY CABLES

HOME SCREEN



## TECHNICAL SPECIFICATIONS OF DIRECT DRIVE FRICTION WELDING MACHINE SPARTAN.5

### GENERAL SPECIFICATIONS: 5 TON

| Material                            | Metric Measurement |                 | US Measurement |                 |
|-------------------------------------|--------------------|-----------------|----------------|-----------------|
| Maximum Weld Area*                  | 333                | mm <sup>2</sup> | 0.52           | in <sup>2</sup> |
| Minimum Weld Area*                  | 50                 | mm <sup>2</sup> | 0.08           | in <sup>2</sup> |
| Maximum Bar Capacity*               | 20                 | mm              | 0.79           | in              |
| Minimum Bar Capacity*               | 8                  | mm              | 0.31           | in              |
| Maximum Forge Force                 | 50                 | kN              | 11,240         | lbs             |
| Minimum System Force                | 6                  | kN              | 1,349          | lbs             |
| Thrust Cylinder Area                | 3,100              | mm <sup>2</sup> | 4.81           | in <sup>2</sup> |
| Maximum System Pressure             | 162                | bar             | 2,350          | psi             |
| Spindle Speed Variable              | 2,500              | rpm             | 2,500          | rpm             |
| Spindle Bore Depth From Collet Face | 200                | mm              | 7.87           | in              |
| Slide Stroke                        | 200                | mm              | 7.87           | in              |
| Standard Component Length           | 350                | mm              | 13.78          | in              |

### ELECTRICAL

|                                      |                     |     |       |     |
|--------------------------------------|---------------------|-----|-------|-----|
| Spindle Servo Motor**                | 4.71                | kW  | 6.32  | HP  |
| Hydraulic Main Motor                 | 5.5                 | kW  | 7.38  | HP  |
| Hydraulic Secondary Motor            | 3.75                | kW  | 5.03  | HP  |
| Hydraulic Lubrication Motor          | 0.37                | kW  | 0.50  | HP  |
| Total Electrical Power Consumption** | 16                  | kW  | 21.46 | HP  |
| Supply Voltage                       | Globally Compatible |     |       |     |
| Control Voltage                      | 24                  | VDC | 24    | VDC |

### HYDRAULICS

|                              |     |        |       |         |
|------------------------------|-----|--------|-------|---------|
| HPU Main Pump                | 13  | lpm    | 3.43  | gpm     |
| HPU Clamping Pump            | 13  | lpm    | 3.43  | gpm     |
| HPU Lubrication Pump         | 2.5 | lpm    | 0.66  | gpm     |
| Hydraulic Reservoir Capacity | 160 | Liters | 42.27 | Gallons |

\*Carbon Steel

\*\*Application Dependant



## DIRECT DRIVE FRICTION WELDING MACHINE SPARTAN.15

A 15-ton standard Direct Drive Friction Welder, the SPARTAN 15 has a minimum weld area of 150 mm<sup>2</sup> and a maximum weld area of 1000 mm<sup>2</sup>.

For increased production volume and reduced cycle time, this cost-effective friction welder can be automated or integrated into an existing production cell.

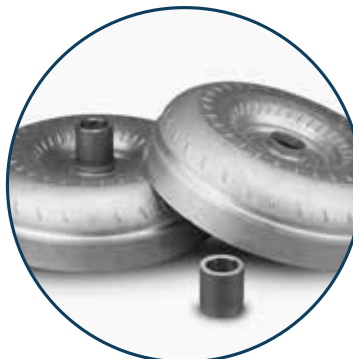
Backed by MTI's standard warranty, the SPARTAN 15 is ideal for torque converters, drivetrain components, passenger side airbag inflators and similar cross sections—just to name a few.

To accommodate a large range of part lengths, base extensions are available in multiples of 300 mm.

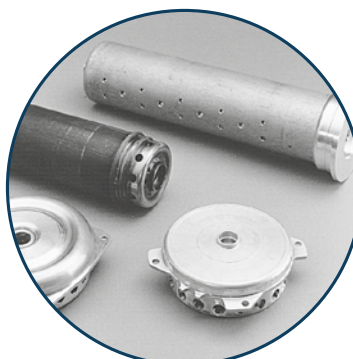
To learn if the Spartan 15 is right for you next project, talk to our experts about:

- The materials you're joining
- The weld geometry of your two parts
- The area of your weld interface

[Click here to email our experts](#)



TORQUE CONVERTER



AIRBAG INFLATOR



DRIVETRAIN COMPONENTS

SETTINGS SCREEN

24/12/2015 16:52:00 PM  
Login: super admin

**SPARTAN.15 FWT** **MANUAL**

Control Settings Default 3D Tools Login Reports Other Exit

**Settings**

Job Name: FWTPL SS 8 mm EN8 8 mm

Process Mode: Burn-off Mode

Time (sec) [Operator Limits] RPM [Operator Limits]

|                  | Lower | Upper   |            | Lower | Upper     |
|------------------|-------|---------|------------|-------|-----------|
| Friction 1 (T1A) | NA    | NA      | Friction 1 | 2500  | 2400 2500 |
| Friction 2 (T1B) | NA    | NA      | Friction 2 | 2500  | 2400 2500 |
| Brake Delay (T2) | 0.1   | 0.1 0.3 |            |       |           |
| Upset Delay (T3) | 0.3   | 0.3 0.6 |            |       |           |
| Upset (T4)       | 2.0   | 2.0 6.0 |            |       |           |

Force (bar)

|                 | Lower | Upper |
|-----------------|-------|-------|
| Friction 1 (P1) | 15    | 13 17 |
| Friction 2 (P2) | 15    | 13 17 |
| Upset (P3)      | 30    | 25 35 |

Consumption (mm) [Min] [Max]

|                   | Min | Max     |
|-------------------|-----|---------|
| Burn-Off          | 3.0 | 3.0 3.6 |
| Estimated Time    | 2.0 | 2.0 3.0 |
| Desired Shrinkage | 4.0 | 4.0 6.0 |

Force 0.0 kg / mm<sup>2</sup>  
Dia 0.0 mm

Calculate  
Pressure 0.1 bar

Back

Add Edit Delete Save as Masters Apply Parameters







## TECHNICAL SPECIFICATIONS OF DIRECT DRIVE FRICTION WELDING MACHINE SPARTAN-15

### GENERAL SPECIFICATIONS: 15 TON

| Material                            | Metric Measurement |                 | US Measurement |                 |
|-------------------------------------|--------------------|-----------------|----------------|-----------------|
| Maximum Weld Area*                  | 1,000              | mm <sup>2</sup> | 1.55           | in <sup>2</sup> |
| Minimum Weld Area*                  | 150                | mm <sup>2</sup> | 0.23           | in <sup>2</sup> |
| Maximum Bar Capacity*               | 36                 | mm              | 1.42           | in              |
| Minimum Bar Capacity*               | 14                 | mm              | 0.55           | in              |
| Maximum Forge Force                 | 150                | kN              | 33,721         | lbs             |
| Minimum System Force                | 16                 | kN              | 3,597          | lbs             |
| Thrust Cylinder Area                | 8,108              | mm <sup>2</sup> | 12.57          | in <sup>2</sup> |
| Maximum System Pressure             | 185                | bar             | 2,683          | psi             |
| Spindle Speed Variable              | 2,000              | rpm             | 2,000          | rpm             |
| Spindle Bore Depth From Collet Face | 200                | mm              | 7.87           | in              |
| Slide Stroke                        | 300                | mm              | 11.81          | in              |
| Standard Component Length           | 600                | mm              | 23.62          | in              |

Further length extensions are available in multiples of 300 mm

### ELECTRICAL

|                                      |                     |     |       |     |
|--------------------------------------|---------------------|-----|-------|-----|
| Spindle Servo Motor**                | 18.4                | kW  | 24.67 | HP  |
| Hydraulic Main Motor                 | 11                  | kW  | 14.75 | HP  |
| Hydraulic Secondary Motor            | 2.2                 | kW  | 2.95  | HP  |
| Hydraulic Lubrication Motor          | -                   | -   | -     | -   |
| Total Electrical Power Consumption** | 32                  | kW  | 42.91 | HP  |
| Supply Voltage                       | Globally Compatible |     |       |     |
| Control Voltage                      | 24                  | VDC | 24    | VDC |

### HYDRAULICS

|                              |     |        |       |         |
|------------------------------|-----|--------|-------|---------|
| HPU Main Pump                | 27  | lpm    | 7.13  | gpm     |
| HPU Clamping Pump            | -   | -      | -     | -       |
| HPU Lubrication Pump         | -   | -      | -     | -       |
| Hydraulic Reservoir Capacity | 200 | Liters | 52.83 | Gallons |

\*Carbon Steel

\*\*Application Dependant



## DIRECT DRIVE FRICTION WELDING MACHINE SPARTAN.30

The most popular of the SPARTAN line, this 30-ton machine handles the widest range of parts. With a minimum weld area of 300 mm<sup>2</sup> and a maximum weld area of 2000 mm<sup>2</sup>, this friction welder was built to take on the rapidly changing automotive industry.

Expertly engineered and backed by MTI's standard warranty, this 30-ton Direct Drive Friction Welder sticks to the basics to provide you with consistent, durable welds at a reduced cost.

Add automation to the SPARTAN 30 for an even greater increase in production volume and reduced cycle times.

A practical joining solution, the SPARTAN 30 is used to weld a plethora of parts ranging from torque rods to carbon steel drill bits.

To learn if the Spartan 30 is right for you next project, talk to our experts about:

- The materials you're joining
- The weld geometry of your two parts
- The area of your weld interface

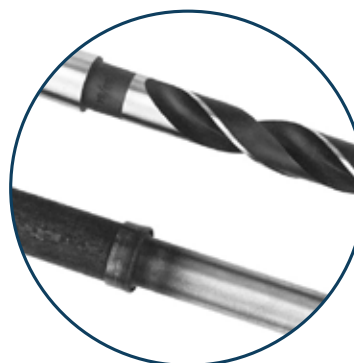
[Click here to email our experts](#)



FRONT-WHEEL-DRIVE  
DRIVE SHAFT



TORQUE ROD



CARBON STEEL DRILL BIT

### PRODUCTION REPORTS

24/11/2016 17:02:21 PM  
Login : super admin

**SPARTAN.30** THE 30TH ANNUAL  
**FWT** FORWARD THINKING

**MANUAL**

## Reports

### Production Chart

### Individual Job Parameters

### Statistical Report

AI

From Date 24/01/2016

Date Range

To Date 24/01/2016

AI

Operator wise

Accepted

Search by Job

Search by Batch

Print Preview

Generate Report

Export to Excel

| Date       | Time     | Job Name   | Batch | Job No. | T16 | T18 | T2  | T3  | T4  | P1  | P2  | P3  | Cycle Time | Shift | Status   | Operator |
|------------|----------|------------|-------|---------|-----|-----|-----|-----|-----|-----|-----|-----|------------|-------|----------|----------|
| 24/11/2016 | 08:00:00 | SPARTAN.30 | 001   | 1       | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0        | 1.0   | Accepted | Operator |
| 24/11/2016 | 08:00:00 | SPARTAN.30 | 001   | 2       | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0        | 1.0   | Accepted | Operator |
| 24/11/2016 | 08:00:00 | SPARTAN.30 | 001   | 3       | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0        | 1.0   | Accepted | Operator |
| 24/11/2016 | 08:00:00 | SPARTAN.30 | 001   | 4       | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0        | 1.0   | Accepted | Operator |
| 24/11/2016 | 08:00:00 | SPARTAN.30 | 001   | 5       | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0        | 1.0   | Accepted | Operator |
| 24/11/2016 | 08:00:00 | SPARTAN.30 | 001   | 6       | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0        | 1.0   | Accepted | Operator |
| 24/11/2016 | 08:00:00 | SPARTAN.30 | 001   | 7       | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0        | 1.0   | Accepted | Operator |
| 24/11/2016 | 08:00:00 | SPARTAN.30 | 001   | 8       | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0        | 1.0   | Accepted | Operator |
| 24/11/2016 | 08:00:00 | SPARTAN.30 | 001   | 9       | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0        | 1.0   | Accepted | Operator |
| 24/11/2016 | 08:00:00 | SPARTAN.30 | 001   | 10      | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0        | 1.0   | Accepted | Operator |
| 24/11/2016 | 08:00:00 | SPARTAN.30 | 001   | 11      | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0        | 1.0   | Accepted | Operator |
| 24/11/2016 | 08:00:00 | SPARTAN.30 | 001   | 12      | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0        | 1.0   | Accepted | Operator |
| 24/11/2016 | 08:00:00 | SPARTAN.30 | 001   | 13      | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0        | 1.0   | Accepted | Operator |
| 24/11/2016 | 08:00:00 | SPARTAN.30 | 001   | 14      | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0        | 1.0   | Accepted | Operator |
| 24/11/2016 | 08:00:00 | SPARTAN.30 | 001   | 15      | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0        | 1.0   | Accepted | Operator |
| 24/11/2016 | 08:00:00 | SPARTAN.30 | 001   | 16      | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0        | 1.0   | Accepted | Operator |
| 24/11/2016 | 08:00:00 | SPARTAN.30 | 001   | 17      | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0        | 1.0   | Accepted | Operator |
| 24/11/2016 | 08:00:00 | SPARTAN.30 | 001   | 18      | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0        | 1.0   | Accepted | Operator |
| 24/11/2016 | 08:00:00 | SPARTAN.30 | 001   | 19      | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0        | 1.0   | Accepted | Operator |
| 24/11/2016 | 08:00:00 | SPARTAN.30 | 001   | 20      | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0        | 1.0   | Accepted | Operator |
| 24/11/2016 | 08:00:00 | SPARTAN.30 | 001   | 21      | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0        | 1.0   | Accepted | Operator |
| 24/11/2016 | 08:00:00 | SPARTAN.30 | 001   | 22      | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0        | 1.0   | Accepted | Operator |
| 24/11/2016 | 08:00:00 | SPARTAN.30 | 001   | 23      | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0        | 1.0   | Accepted | Operator |
| 24/11/2016 | 08:00:00 | SPARTAN.30 | 001   | 24      | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0        | 1.0   | Accepted | Operator |
| 24/11/2016 | 08:00:00 | SPARTAN.30 | 001   | 25      | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0        | 1.0   | Accepted | Operator |
| 24/11/2016 | 08:00:00 | SPARTAN.30 | 001   | 26      | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0        | 1.0   | Accepted | Operator |
| 24/11/2016 | 08:00:00 | SPARTAN.30 | 001   | 27      | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0        | 1.0   | Accepted | Operator |
| 24/11/2016 | 08:00:00 | SPARTAN.30 | 001   | 28      | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0        | 1.0   | Accepted | Operator |
| 24/11/2016 | 08:00:00 | SPARTAN.30 | 001   | 29      | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0        | 1.0   | Accepted | Operator |
| 24/11/2016 | 08:00:00 | SPARTAN.30 | 001   | 30      | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0        | 1.0   | Accepted | Operator |
| 24/11/2016 | 08:00:00 | SPARTAN.30 | 001   | 31      | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0        | 1.0   | Accepted | Operator |
| 24/11/2016 | 08:00:00 | SPARTAN.30 | 001   | 32      | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0        | 1.0   | Accepted | Operator |
| 24/11/2016 | 08:00:00 | SPARTAN.30 | 001   | 33      | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0        | 1.0   | Accepted | Operator |
| 24/11/2016 | 08:00:00 | SPARTAN.30 | 001   | 34      | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0        | 1.0   | Accepted | Operator |
| 24/11/2016 | 08:00:00 | SPARTAN.30 | 001   | 35      | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0        | 1.0   | Accepted | Operator |
| 24/11/2016 | 08:00:00 | SPARTAN.30 | 001   | 36      | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0        | 1.0   | Accepted | Operator |
| 24/11/2016 | 08:00:00 | SPARTAN.30 | 001   | 37      | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0        | 1.0   | Accepted | Operator |
| 24/11/2016 | 08:00:00 | SPARTAN.30 | 001   | 38      | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0        | 1.0   | Accepted | Operator |
| 24/11/2016 | 08:00:00 | SPARTAN.30 | 001   | 39      | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0        | 1.0   | Accepted | Operator |
| 24/11/2016 | 08:00:00 | SPARTAN.30 | 001   | 40      | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0        | 1.0   | Accepted | Operator |
| 24/11/2016 | 08:00:00 | SPARTAN.30 | 001   | 41      | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0        | 1.0   | Accepted | Operator |
| 24/11/2016 | 08:00:00 | SPARTAN.30 | 001   | 42      | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0        | 1.0   | Accepted | Operator |
| 24/11/2016 | 08:00:00 | SPARTAN.30 | 001   | 43      | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0        | 1.0   | Accepted | Operator |
| 24/11/2016 | 08:00:00 | SPARTAN.30 | 001   | 44      | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0        | 1.0   | Accepted | Operator |
| 24/11/2016 | 08:00:00 | SPARTAN.30 | 001   | 45      | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0        | 1.0   | Accepted | Operator |
| 24/11/2016 | 08:00:00 | SPARTAN.30 | 001   | 46      | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0        | 1.0   | Accepted | Operator |
| 24/11/2016 | 08:00:00 | SPARTAN.30 | 001   | 47      | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0        | 1.0   | Accepted | Operator |
| 24/11/2016 | 08:00:00 | SPARTAN.30 | 001   | 48      | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0        | 1.0   | Accepted | Operator |
| 24/11/2016 | 08:00:00 | SPARTAN.30 | 001   | 49      | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0        | 1.0   | Accepted | Operator |
| 24/11/2016 | 08:00:00 | SPARTAN.30 | 001   | 50      | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0        | 1.0   | Accepted | Operator |
| 24/11/2016 | 08:00:00 | SPARTAN.30 | 001   | 51      | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0        | 1.0   | Accepted | Operator |
| 24/11/2016 | 08:00:00 | SPARTAN.30 | 001   | 52      | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0        | 1.0   | Accepted | Operator |
| 24/11/2016 | 08:00:00 | SPARTAN.30 | 001   | 53      | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0        | 1.0   | Accepted | Operator |
| 24/11/2016 | 08:00:00 | SPARTAN.30 | 001   | 54      | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0        | 1.0   | Accepted | Operator |
| 24/11/2016 | 08:00:00 | SPARTAN.30 | 001   | 55      | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0        | 1.0   | Accepted | Operator |
| 24/11/2016 | 08:00:00 | SPARTAN.30 | 001   | 56      | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0        | 1.0   | Accepted | Operator |
| 24/11/2016 | 08:00:00 | SPARTAN.30 | 001   | 57      | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0        | 1.0   | Accepted | Operator |
| 24/11/2016 | 08:00:00 | SPARTAN.30 | 001   | 58      | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0        | 1.0   | Accepted | Operator |
| 24/11/2016 | 08:00:00 | SPARTAN.30 | 001   | 59      | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0        | 1.0   | Accepted | Operator |
| 24/11/2016 | 08:00:00 | SPARTAN.30 | 001   | 60      | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0        | 1.0   | Accepted | Operator |
| 24/11/2016 | 08:00:00 | SPARTAN.30 | 001   | 61      | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0        | 1.0   | Accepted | Operator |
| 24/11/2016 | 08:00:00 | SPARTAN.30 | 001   | 62      | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0        | 1.0   | Accepted | Operator |
| 24/11/2016 | 08:00:00 | SPARTAN.30 | 001   | 63      | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0        | 1.0   | Accepted | Operator |
| 24/11/2016 | 08:00:00 | SPARTAN.30 | 001   | 64      | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0        | 1.0   | Accepted | Operator |
| 24/11/2016 | 08:00:00 | SPARTAN.30 | 001   | 65      | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0        | 1.0   | Accepted | Operator |
| 24/11/2016 | 08:00:00 | SPARTAN.30 | 001   | 66      | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0        | 1.0   | Accepted | Operator |
| 24/11/2016 | 08:00:00 | SPARTAN.30 | 001   | 67      | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0        | 1.0   | Accepted | Operator |
| 24/11/2016 | 08:00:00 | SPARTAN.30 | 001   | 68      | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0        | 1.0   | Accepted | Operator |
| 24/11/2016 | 08:00:00 | SPARTAN.30 | 001   | 69      | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0        | 1.0   | Accepted | Operator |
| 24/11/2016 | 08:00:00 | SPARTAN.30 | 001   | 70      | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0        | 1.0   | Accepted | Operator |
| 24/11/2016 | 08:00:00 | SPARTAN.30 | 001   | 71      | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0        | 1.0   | Accepted | Operator |
| 24/11/2016 | 08:00:00 | SPARTAN.30 | 001   | 72      | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0        | 1.0   | Accepted | Operator |
| 24/11/2016 | 08:00:00 | SPARTAN.30 | 001   | 73      | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0        | 1.0   | Accepted | Operator |
| 24/11/2016 | 08:00:00 | SPARTAN.30 | 001   | 74      | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0        | 1.0   | Accepted | Operator |
| 24/11/2016 | 08:00:00 | SPARTAN.30 | 001   | 75      | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0        | 1.0   | Accepted | Operator |
| 24/11/2016 | 08:00:00 | SPARTAN.30 | 001   | 76      | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0        | 1.0   | Accepted | Operator |
| 24/11/2016 | 08:00:00 | SPARTAN.30 | 001   | 77      | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |     |     |            |       |          |          |



## TECHNICAL SPECIFICATIONS OF DIRECT DRIVE FRICTION WELDING MACHINE SPARTAN-30

### GENERAL SPECIFICATIONS: 30 TON

| Material                            | Metric Measurement |                 | US Measurement |                 |
|-------------------------------------|--------------------|-----------------|----------------|-----------------|
| Maximum Weld Area*                  | 2,000              | mm <sup>2</sup> | 3.10           | in <sup>2</sup> |
| Minimum Weld Area*                  | 300                | mm <sup>2</sup> | 0.47           | in <sup>2</sup> |
| Maximum Bar Capacity*               | 50                 | mm              | 1.97           | in              |
| Minimum Bar Capacity*               | 20                 | mm              | 0.79           | in              |
| Maximum Forge Force                 | 300                | kN              | 67,443         | lbs             |
| Minimum System Force                | 25                 | kN              | 5,620          | lbs             |
| Thrust Cylinder Area                | 12,200             | mm <sup>2</sup> | 18.91          | in <sup>2</sup> |
| Maximum System Pressure             | 244                | bar             | 3,539          | psi             |
| Spindle Speed Variable              | 2,500              | rpm             | 2,500          | rpm             |
| Spindle Bore Depth From Collet Face | 200                | mm              | 7.87           | in              |
| Slide Stroke                        | 300                | mm              | 11.81          | in              |
| Standard Component Length           | 600                | mm              | 23.62          | in              |

Further length extensions are available in multiples of 300 mm

### ELECTRICAL

|                                      |                     |     |       |     |
|--------------------------------------|---------------------|-----|-------|-----|
| Spindle Servo Motor**                | 24.3                | kW  | 32.59 | HP  |
| Hydraulic Main Motor                 | 18.5                | kW  | 24.81 | HP  |
| Hydraulic Secondary Motor            | 3.75                | kW  | 5.03  | HP  |
| Hydraulic Lubrication Motor          | -                   | -   | -     | -   |
| Total Electrical Power Consumption** | 47                  | kW  | 63.03 | HP  |
| Supply Voltage                       | Globally Compatible |     |       |     |
| Control Voltage                      | 24                  | VDC | 24    | VDC |

### HYDRAULICS

|                              |     |        |       |         |
|------------------------------|-----|--------|-------|---------|
| HPU Main Pump                | 24  | lpm    | 6.34  | gpm     |
| HPU Clamping Pump            | -   | -      | -     | -       |
| HPU Lubrication Pump         | 44  | lpm    | 11.62 | gpm     |
| Hydraulic Reservoir Capacity | 250 | Liters | 66.04 | Gallons |

\*Carbon Steel

\*\*Application Dependant





## DIRECT DRIVE FRICTION WELDING MACHINE SPARTAN.45

The largest machine in the SPARTAN line, this 45-ton Direct Drive Friction Welder provides lower cost joining solutions for the fast-paced and ever-changing automotive industry.

A cost-effective machine, the SPARTAN 45 has a minimum weld area of 490 mm<sup>2</sup> and a maximum weld area of 3000 mm<sup>2</sup> to handle a vast assortment of parts.

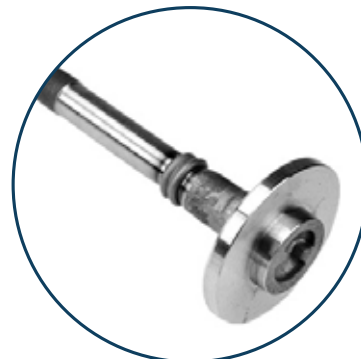
Excelling at high-volume production, the SPARTAN 45 can be automated or integrated into an existing production cell. Automation takes individual operator skill out of the equation to deliver consistent, defect-free parts you can count on, every time.

Manufactured to the highest quality standards and backed by MTI's standard warranty, the SPARTAN 45 is an ideal joining solution for axle tubes, flanged axle shafts, hydraulic cylinder rods, and more.

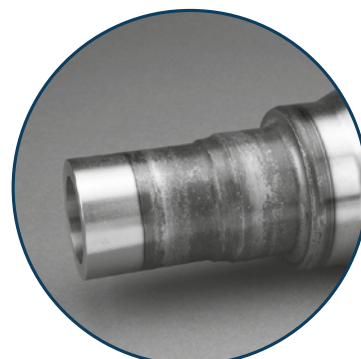
To learn if the Spartan 45 is right for you next project, talk to our experts about:

- The materials you're joining
- The weld geometry of your two parts
- The area of your weld interface

[Click here to email our experts](#)



FLANGED AXLE SHAFTS

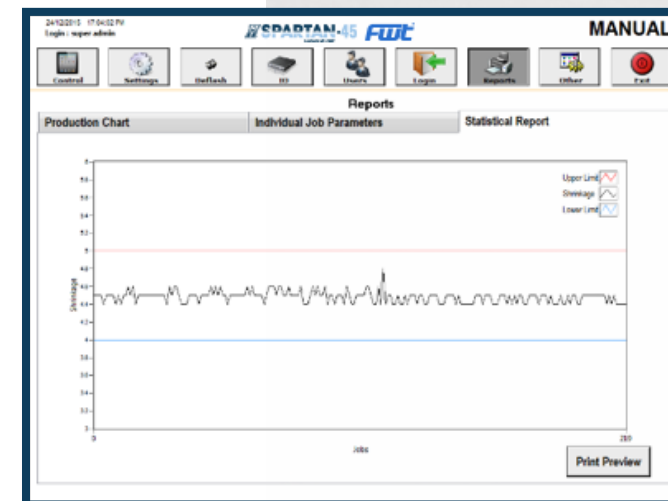


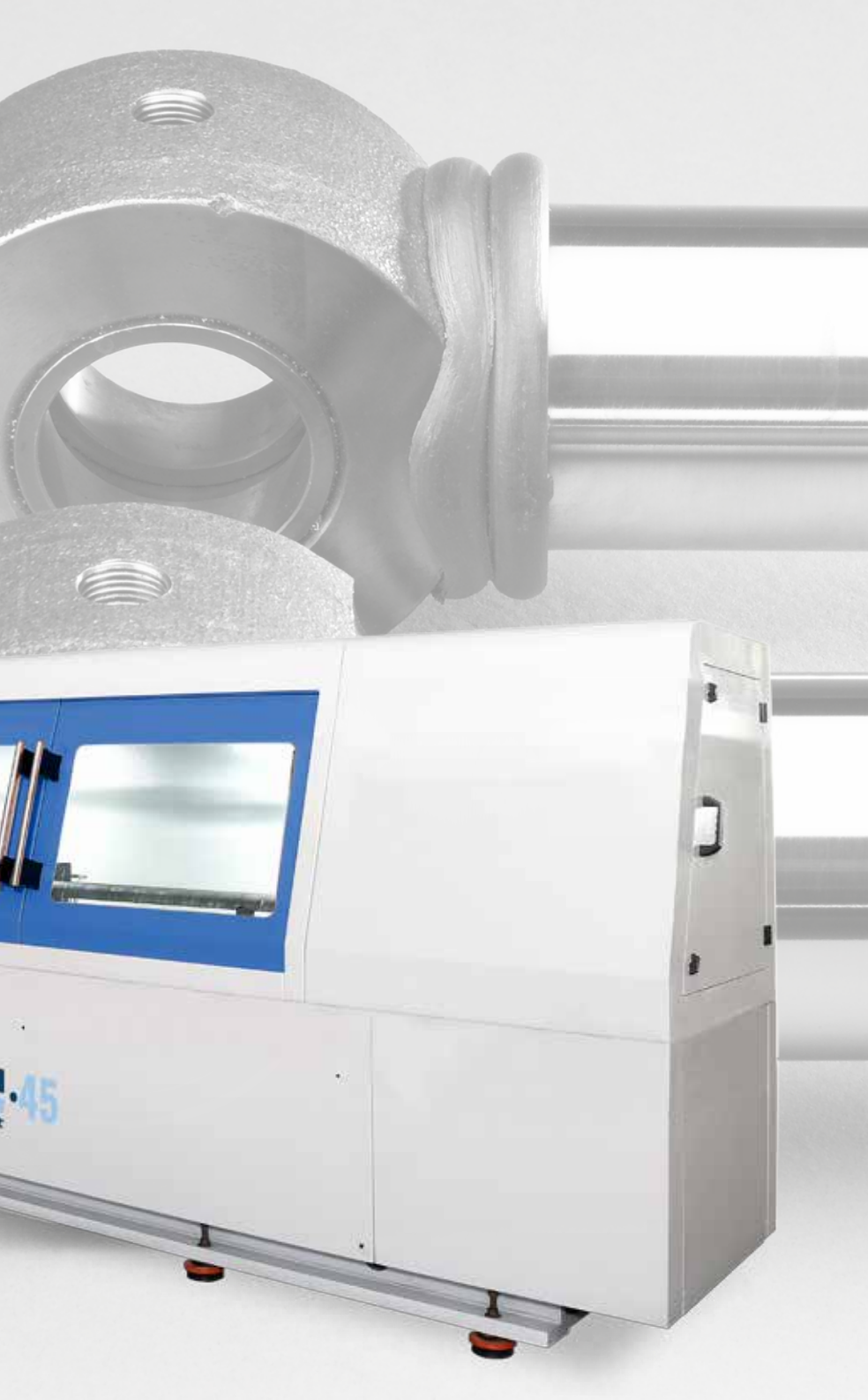
AXLE TUBES



AXEL SHAFTS

STATISTICAL ANALYSIS





# TECHNICAL SPECIFICATIONS OF DIRECT DRIVE FRICTION WELDING MACHINE SPARTAN.45



## GENERAL SPECIFICATIONS: 45 TON

| Material                            | Carbon Steel |                 | Measurement |                 |
|-------------------------------------|--------------|-----------------|-------------|-----------------|
| Maximum Weld Area*                  | 3,000        | mm <sup>2</sup> | 4.65        | in <sup>2</sup> |
| Minimum Weld Area*                  | 490          | mm <sup>2</sup> | 0.76        | in <sup>2</sup> |
| Maximum bar capacity*               | 60           | mm              | 2.36        | in              |
| Minimum bar capacity*               | 25           | mm              | 0.98        | in              |
| Maximum Forge Force                 | 450          | kN              | 101,164     | lbs             |
| Minimum System Force                | 40           | kN              | 8,992       | lbs             |
| Thrust Cylinder Area                | 20,100       | mm <sup>2</sup> | 31.16       | in <sup>2</sup> |
| Maximum System Pressure             | 224          | bar             | 3,249       | psi             |
| Spindle Speed Variable              | 2,000        | rpm             | 2,000       | rpm             |
| Spindle bore depth from Collet face | 200          | mm              | 7.87        | in              |
| Slide Stroke                        | 300          | mm              | 11.81       | in              |
| Standard Component Length           | 600          | mm              | 23.62       | in              |

Further length extensions are available in multiples of 300 mm

## ELECTRICAL

|                                      |                     |     |       |     |
|--------------------------------------|---------------------|-----|-------|-----|
| Spindle Servo Motor**                | 33.8                | kW  | 45.33 | HP  |
| Hydraulic Main Motor                 | 22                  | kW  | 29.50 | HP  |
| Hydraulic Secondary Motor            | 3.75                | kW  | 5.03  | HP  |
| Hydraulic Lubrication Motor          | -                   | -   | -     | -   |
| Total Electrical Power Consumption** | 60                  | kW  | 80.46 | HP  |
| Supply Voltage                       | Globally Compatible |     |       |     |
| Control Voltage                      | 24                  | VDC | 24    | VDC |

## HYDRAULICS

|                              |     |        |       |         |
|------------------------------|-----|--------|-------|---------|
| HPU Main Pump                | 24  | lpm    | 6.34  | gpm     |
| HPU Clamping Pump            | -   | -      | -     | -       |
| HPU Lubrication Pump         | 50  | lpm    | 13.21 | gpm     |
| Hydraulic Reservoir Capacity | 250 | Liters | 66.04 | Gallons |

\*Carbon Steel

\*\*Application Dependant

# SPARTAN Options

The cost-effective SPARTAN line offers a high quality standard base machine with a select number of optional features that can easily be configured to get the most out of your machine.

Tailor these options to suit your application requirements without adding significant customized engineering requirements.

## Fixture Clamping Options

Depending on your parts, talk to our experts to determine which fixture clamping option is best for you.



### Fixture Collet Clamp

Suitable for gripping short components while providing high gripping force, this low cost, low maintenance option offers less part marking and high accuracy.



### Self-Centring Fixture Clamp

Suitable for all bar/tube applications, this clamp uses an adjustable back-stop and includes quick change tooling for reduced production downtime.

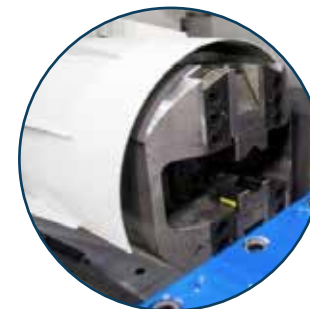
## Chuck Options

Chuck options also include quick change tooling inserts for dramatically reduced changeover time. Swiftly and seamlessly complete tool changes in as little as 30 seconds with collet chucks.



### Collet Chucks

Offering 360-degree contact grip and minimal marking, collet chucks are a lower cost, lower maintenance solution that deliver high accuracy and precision.



### Two/Three Jaw Chuck

Versatile two and three Jaw Chucks are available for a wide array of applications including: Piston Rods, 'S' Cams, Yokes, and Forgings.





# Automation

Designed with automation in mind, the SPARTAN can seamlessly integrate into your existing production line or a fully automated production cell. This allows for reduced production cycle time and increased production volume.

Whether you require a robot, special part-handling mechanisms or a conveyor, the SPARTAN can handle it.

**Click here to talk with our automation experts**

FLASH REMOVAL SINGLE PASS TURNING



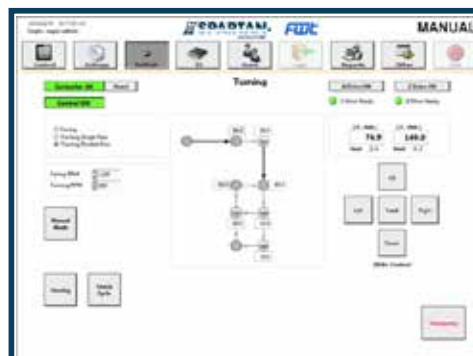
## Flash Removal

A robust 2-axis servo Flash Removal unit with NC control provides in-machine flash removal capabilities. Upon completion of the weld cycle, the tailstock fixture unclamps and an optional steady rest engages the shaft. Afterward, the cutting tool advances per a pre-programmed tool path.

Programming of the tool path is done through the Windows interface and saved together with the weld program for each part number.



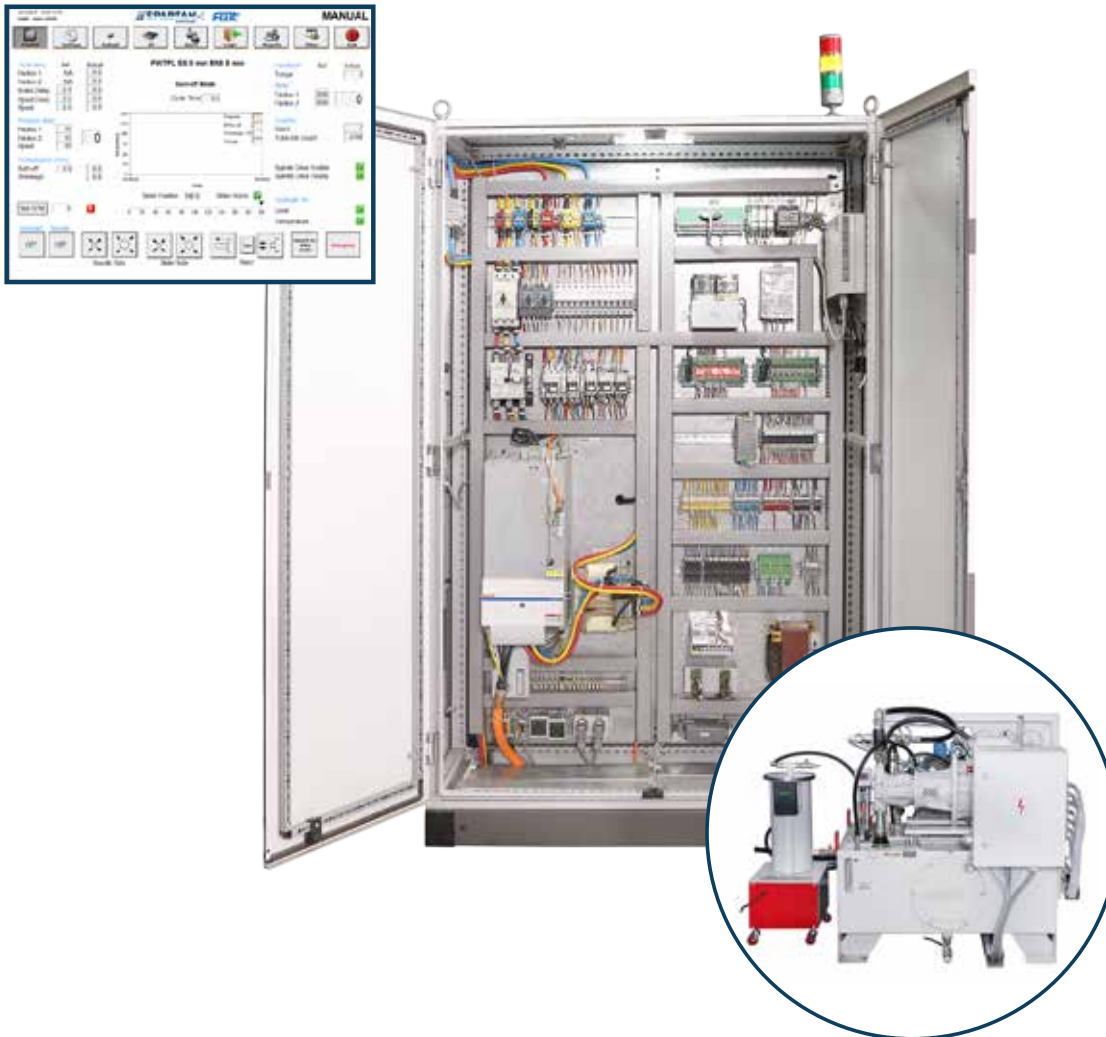
FLASH REMOVAL DOUBLE PASS TURNING



## FLASH REMOVAL ASSEMBLY SPECIFICATIONS

| Machine Size | Stroke (mm) |        | Motor Capacity |             |
|--------------|-------------|--------|----------------|-------------|
|              | X-axis      | Y-axis | Power (Watts)  | Torque (Nm) |
| 5 Ton        | 100         | 150    | 400            | 1.27        |
| 15 Ton       | 100         | 150    | 750            | 2.39        |
| 30 Ton       | 100         | 150    | 750            | 2.39        |
| 45 Ton       | 100         | 150    | 750            | 2.39        |

# General Machine Supply



## Standard Components

To ensure the utmost quality, the SPARTAN is built using globally available standard components.

|   |                                   |
|---|-----------------------------------|
| <b>Industrial Panel PC</b>                        | Industrial Grade                  |
| <b>PLC</b>  | Phoenix / Allen Bradley / Siemens |
| <b>Spindle Motor &amp; Servo Drives</b>           | Bosch Rexroth                     |
| <b>Hydraulic Components, Pumps, &amp; Valves</b>  | Bosch Rexroth                     |
| <b>Limit Switches &amp; Safety Switches</b>       | Euchner                           |
| <b>Electrical Cabinets, Enclosures, &amp; A/C</b> | Rittal                            |
| <b>Linear Cross Roller / LM Guides</b>            | SCHNEEBERGER                      |
| <b>Bearings</b>                                   | FAG / SKF / RHP / TIMKEN / NSK    |
| <b>Lubrication Unit</b>                           | Cenlube Oil / Grease Lubrication  |
| <b>Software Platform LABVIEW</b>                  | National Instruments              |

# ***Delivering Peace of Mind***

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## **Warranty**

Designed to meet the very highest quality standards, the SPARTAN product line is backed by MTI's standard one-year limited warranty.

## **Preventative Maintenance Package**

We stand behind the quality of our machines and parts. An extended warranty of one year is available with the purchase of our enhanced preventative maintenance package.

That's why our Preventative Maintenance Package provides a cost-effective method to pro-actively identify potential trouble spots and combat production downtimes.

With scheduled visits, remote monitoring and assistance, inspection and repair, oil sampling, hands-on training, and more, our maintenance package gives you an essential tool for prolonging the life of your SPARTAN machine.

## **Global Service & Support**

What makes having the best technology in the world even better? Knowing MTI can help you keep that technology at its best. Our global service locations in North America, Europe, and China make it easy to do business with us.

## **The Enhanced Preventative Maintenance Plan**

**KEEP EVERYTHING RUNNING SMOOTHLY WITH AN ELEVATED LEVEL OF SUPPORT**

**5% Spare Parts Discount**

**5% Machine Part Replacement Discount**

**10% Emergency Service Discount**

**0% Re-laser Alignment Discount**

**10% Discount Instrument Calibration (RPM/PSI) using MTI calibrated equipment**

**1 Visit/Year**

**2 Days on Site**

**36 Hr Response**

**Oil Sampling & Report**

**10% On-Site Training Discount**

**25%MRA Remote Assistance Included**





The SPARTAN is a direct drive friction welder manufactured with FWT, our long-standing partner in India. Founded in 2002, FWT has earned global respect for its commitment to quality and excellence with a proven track record in producing high-quality, cost-efficient products.



#### **MTI Welding Technologies, Ltd.**

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#### **Manufacturing Technology, Inc. Corporate Headquarters**

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